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The impact of considering birthplace in analyses of immigrant health

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Abstract

Background

Despite the heterogeneity of Canada's immigrant population, small sample sizes often prevent health researchers from studying specific subgroups. This report demonstrates how combining cycles of the Canadian Community Health Survey (CCHS) makes it possible to move beyond the Canadian-born/immigrant dichotomy to more refined analyses of immigrant health.

Data and methods

Based on combined data from the 2003, 2005, and 2007/2008 CCHS, this analysis compares the age-standardized prevalence of fair/poor self-perceived health, diabetes and arthritis among immigrants and the Canadian-born population at three progressively more precise breakdowns of immigrants by birthplace.

Results

Overall, immigrants were more likely than the Canadian-born to report poor health and diabetes, but less likely to report arthritis. This association changed when the immigrant group was disaggregated. This report demonstrates the importance of analyzing immigrants' health outcomes by birthplace and duration of residence in Canada.

Interpretation

Studies based on the immigrant/non-immigrant dichotomy combine immigrants with different risk factors, settlement experiences and health behaviours, and can yield findings that appear contradictory. Analysis of more specific immigrant subgroups improves understanding of immigrants' health relative to that of the Canadian-born population.

Keywords

Arthritis, diabetes, birthplace, health surveys, immigration, self-perceived health, time since immigration

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According to the 2006 Census, nearly 20% of Canada's population were foreign-born.[1] Moreover, in the last 35 years, the predominant source countries of immigrants to Canada have shifted from Europe to Asia, the Middle East and Africa.[1] Because of immigrants' increasingly diverse origins, it is important to study them as a non-homogenous group. A challenge facing health researchers is that small sample surveys can limit the analysis of immigrant subpopulations.[2,3]

The objective of this article is to illustrate how combining data from several cycles of the Canadian Community Health Survey (CCHS) increases analytical power and yields a clearer picture of immigrant health by identifying more precise subgroups. Examples are presented to demonstrate how indicators of health status vary by birthplace and period of immigration.

Data and methods

The data are from Statistics Canada's 2003, 2005, and 2007/2008 Canadian Community Health Survey (CCHS). The CCHS collects information about health determinants, socio-demographic characteristics and disease status. The survey targets people aged 12 or older who live in private dwellings in the provinces and territories. Residents of Indian reserves, Crown lands, institutions and certain remote areas, and full-time members of the Canadian Armed Forces are excluded. The survey covers approximately 98% of the population aged 12 or older in the provinces; 90% in the Yukon; 97% in the Northwest Territories; and 71% in Nunavut.[4,5]

Data were collected by computer-assisted telephone and in-person interviews; 30% to 40% of the interviews were conducted in person. Each Statistics Canada Regional Office recruited interviewers with a wide range of language skills so that when necessary, interviews were conducted in the language of the respondents.[5]

In all of the CCHS cycles, respondents were asked where they were born. Those who reported a country other

than Canada were asked if they had been born Canadian citizens. For this article, respondents who indicated that they had not been born Canadian citizens and who provided their country of birth were initially grouped into two broad categories: European and non-European immigrants. The European category includes the United States of America and Oceania/other. Next, respondents were assigned to one of six regions of birth: 1) United States of America/Oceania/other, 2) Caribbean/Central and South America, 3) Europe, 4) Sub-Saharan Africa, 5) Asia, and 6) North Africa/Middle East (including Kazakhstan, Kyrgyzstan, Uzbekistan) (Appendix Table A). Immigrants were also classified by period of immigration: "recent" (arrived in the ten years before their CCHS interview) and "long-term" (had been in Canada eleven or more years).

Three measures of health—self-perceived health, arthritis and diabetes—were used to demonstrate how the immigrant group definition can influence results. Self-perceived health is a reliable and valid summary measure of health[6] and is strongly predictive of future morbidity and mortality, regardless of race or ethnicity.[6,7] Arthritis and diabetes are associated with decreased quality of life, considerable medical expense, and reduced life expectancy.[8-10] Research suggests that the prevalence of these conditions varies by country of birth,[8-10] and duration of residence in Canada.[11,12] Respondents were asked if a health professional had diagnosed them as having conditions that had lasted, or were expected to last, at least six months. Respondents were then read a list of conditions that included arthritis and diabetes.

The overall response rates to the 2003, 2005 and 2007/2008 CCHS were 81%, 79% and 76%, respectively.[5] Data from these three cycles were combined to attain sample sizes large enough to yield releasable estimates. The combined sample of respondents aged 18 or older who provided enough information to determine their immigration status and place of birth numbered 350,927. Each cycle contributed approximately one-third of the study participants (Appendix Table B). The unweighted pooled survey sample comprised 48,229 immigrants (29,175 European and 19,054 non-European) and 302,698 Canadian-born respondents. The original sampling weights were adjusted by a factor of three (because three cycles were combined) to represent the Canadian household population. The rescaled weighted samples represented 5.1 million immigrants and 18.6 million non-immigrants. The combined estimates do not represent the population of any particular year; rather, they reflect the average Canadian household population across the 2003-to-2007/2008 period. More information about combining CCHS cycles is available elsewhere.[13]

Age is a major determinant of health.[14] The age distributions of Canadian- and foreign-born populations differ substantially. Rates were age-adjusted to eliminate the effects that result from differences in the age distributions of the various populations (Appendix Table C).[15] Age adjustments were done using the direct method; all rates were age-standardized to the 2006 Canadian Census of Population.[16]

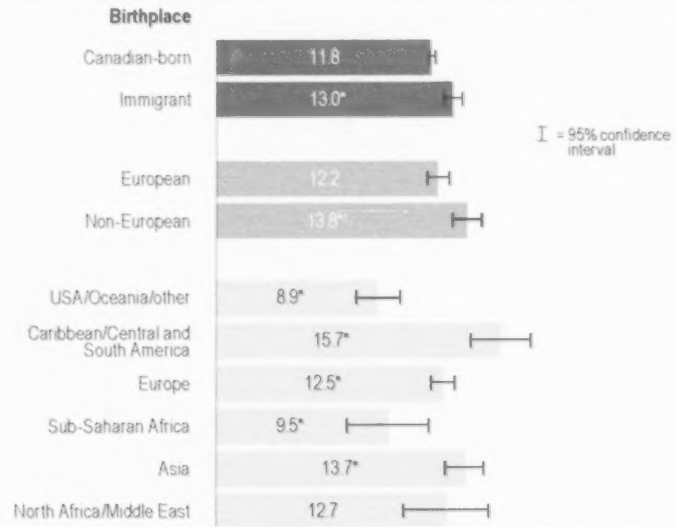
Cross-tabulations were used to compare bivariate rates on the three measures of health—self-perceived health, diabetes and arthritis—for the Canadian-born and immigrant populations. All differences were tested to ensure statistical significance at the α=0.05 level. To account for survey design effects, standard errors and coefficients of variation were estimated with the bootstrap technique.[17,18]

Results

Self-perceived health

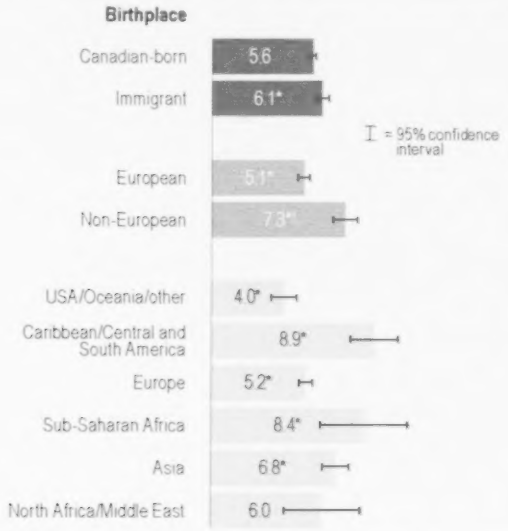
Overall, immigrants were more likely than the Canadian-born to report poor health, but this association depended on immigrants' origins (Figure 1). For example, rates of fair/poor health among

Figure 1
Age-standardized prevalence of fair/poor self-perceived health, by immigrant status and birthplace, household population aged 18 or older, Canada, 2003, 2005 and 2007/2008 combined



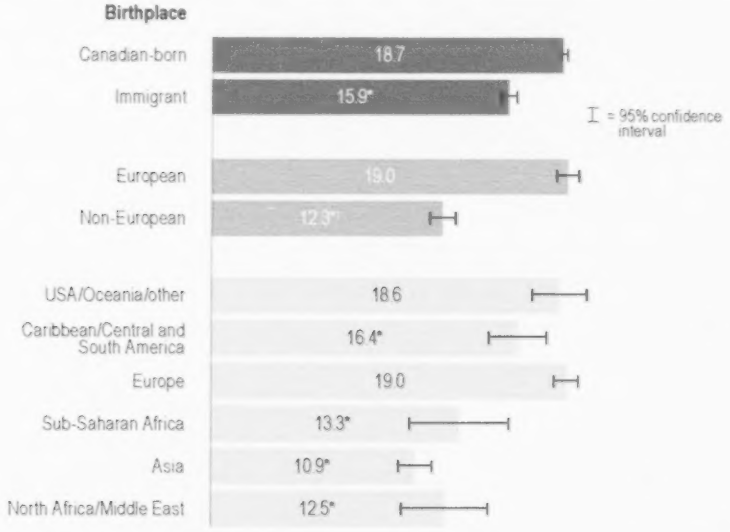
* significantly different from estimate for reference category (p<0.05)
† significantly different from estimate for European (p<0.05)
Note: Unless otherwise stated, reference category is Canadian-born.
Sources: 2003, 2005 and 2007/2008 Canadian Community Health Survey.

Figure 2
Age-standardized prevalence of diabetes, by immigrant status and birthplace, household population aged 18 or older, Canada, 2003, 2005 and 2007/2008 combined



* significantly different from estimate for reference category (p<0.05)
† significantly different from estimate for European (p<0.05)
Note: Unless otherwise stated, reference category is Canadian-born.
Sources: 2003, 2005 and 2007/2008 Canadian Community Health Survey.

Figure 3
Aged standardized prevalence of arthritis, by immigrant status and birthplace, household population aged 18 or older, Canada, 2003, 2005 and 2007/2008 combined



* significantly different from estimate for reference category (p<0.05)
† estimate significantly different from estimate for European (p<0.05)
Note: Unless otherwise stated, reference category is Canadian-born.
Source: 2003, 2005 and 2007/2008 Canadian Community Health Survey.

European immigrants were similar to those of the Canadian-born, but non-European immigrants were more likely to report fair/poor health.

When immigrants were further disaggregated by world region of birth, those from the Caribbean/Central and South America, Asia and Europe were significantly more likely than the Canadian-born to report fair/poor health, while those from Sub-Saharan Africa and the United States/Oceania/other were less likely to do so. And when duration of residence in Canada was also considered, the higher rates of fair/poor self-perceived health of immigrants from the Caribbean/Central and South America, Asia and Europe were largely attributable to long-term immigrants (Table 1). Recent immigrants from the Caribbean/Cental and South America and Europe were less likely than the Canadian-born to report fair/poor health; recent immigrants from Asia had rates comparable to those of the Canadian-born.

Diabetes

A higher percentage of immigrants than the Canadian-born reported diabetes (Figure 2). However, the prevalence was generally higher among immigrants from non-European countries and among those who had lived in Canada for at least ten years (Table 1). Immigrants born in the Caribbean/Central and South America, Sub-Saharan Africa and Asia, especially long-term immigrants, were more likely than the Canadian-born to report diabetes; rates among North African/Middle Eastern immigrants were similar to those of people born in Canada.

Arthritis

The patterns differed for arthritis, which was less common among immigrants overall than among the Canadian-born (Figure 3). However, it was reported by roughly equal percentages of European immigrants and the Canadian-born. When duration of residence was considered, a nearly twofold difference in arthritis prevalence emerged between long-term and recent European

Table 1
Prevalence of fair/poor self-perceived health, diabetes and arthritis by immigrant status, birthplace and duration of residence, household population aged 18 or older, Canada 2003, 2005 and 2007/2008 combined

World region of birth/ Duration of residence	Fair/Poor self-perceived health			Diabetes			Arthritis		
		95% confidence interval			95% confidence interval			95% confidence interval	
	%	from	to	%	from	to	%	from	to
Canadian-born	**11.8**	**11.7**	**12.0**	**5.6**	**5.4**	**5.7**	**18.7**	**18.5**	**18.9**
Immigrant									
Recent	11.4[†]	10.0	13.0	5.3	4.3	6.5	9.0*[†]	7.8	10.4
Long-term	13.7*	13.1	14.2	6.4*	6.0	6.8	17.2*	16.7	17.8
European									
Recent	8.2*[†]	6.2	10.9	F	..	..	10.5*[†]	8.4	13.1
Long-term	12.8*	12.1	13.5	5.3	4.9	5.6	20.0*	19.3	20.7
Non-European									
Recent	12.3	10.6	14.2	6.1	4.8	7.6	8.6[†]	7.2	10.2
Long-term	14.7*	13.8	15.7	7.9*	7.2	8.8	13.6	12.7	14.4
USA/Oceania/other									
Recent	5.8*[†]	3.2	10.2	2.9*[†]	1.5	5.5	10.7*[†]	7.5	15.1
Long-term	9.4*	8.0	11.1	4.0*	3.3	4.9	19.7	17.9	21.6
Caribbean/Central and South America									
Recent	9.5*[†]	6.3	14.3	8.1[†]	4.6	13.6	6.3[†]	3.8	10.2
Long-term	16.9*	15.1	19.0	9.4*	8.0	11.0	17.7	16.0	19.5
Europe									
Recent	8.7*[†]	6.4	11.7	2.2*[†]	1.2	4.0	10.5*[†]	8.1	13.4
Long-term	13.1*	12.3	13.9	5.4	5.0	5.8	20.0*	19.2	20.7
Sub-Saharan Africa									
Recent	7.9[†]	4.2	14.5	F	..	..	14.2[†]	8.8	22.1
Long-term	9.5	7.3	12.3	9.4*	6.8	12.9	13.6*	10.9	16.9
Asia									
Recent	12.9	10.9	15.1	6.3	4.9	8.2	8.8*[†]	7.1	10.7
Long-term	14.6*	13.4	15.9	7.1*	6.3	8.0	11.7*	10.7	12.9
North Africa/Middle East									
Recent	14.5[†]	8.3	23.9	F	..	..	13.3[†]	7.3	23.1
Long-term	13.4	10.8	16.6	7.7[†]	5.3	11.2	14.0*	11.4	17.2

* significantly different from estimate for Canadian-born ($p<0.05$)
† significantly different from estimate for recent immigrants ($p<0.05$)
[†] interpret with caution
F too unreliable to be published
.. not applicable
Sources: 2003, 2005 and 2007/2008 Canadian Community Health Survey

What is already known on this subject?

- Differences in immigrants' health and health care use can exist by world region of birth and duration of residence in Canada, but sample sizes from most surveys do not permit such breakdowns.

What does this study add?

- This study demonstrates the analytical advantage of combining cycles of the Canadian Community Health Survey (CCHS) to examine immigrant health.
- When three cycles of CCHS data are combined, differences emerge in the prevalence of self-reported fair/poor health, arthritis and diabetes by immigrants' birthplace and duration of residence in Canada.
- The combined data demonstrate how moving beyond the Canadian-born/immigrant dichotomy can improve understanding of the health of Canada's immigrant population.

immigrants (Table 1). And based on the world-region-of-birth breakdown and duration of residence, the prevalence of arthritis was similar among people born in Canada and long-term immigrants from the United States/Oceania/other and the Caribbean/Central and South America. The prevalence of arthritis among immigrants exceeded that among the Canadian-born only for long-term European immigrants. Conversely, long-term immigrants from North Africa/Middle East, Sub-Saharan Africa and Asia were less likely than the Canadian-born to report arthritis.

Discussion

Given the growth and diversity of immigrant populations in Canada, a more accurate understanding of their health is important. However, when immigrant groups with different risk factors, settlement experiences and health behaviours are examined as a whole, findings can be contradictory. For example, according to some studies based on the immigrant/non-immigrant dichotomy, immigrants tend to report poorer health.[3] Other studies find that immigrants have a health advantage with respect to chronic diseases.[19-21] And still other studies reveal no difference in self-perceived health between the Canadian- and foreign-born.[2] While variations in methodology, data sources and indicators contribute to this inconsistency, so, too, does use of the broad immigrant/non-immigrant categorization.

This study demonstrates the analytical advantage of combining cycles of the CCHS. It also shows how sensitive estimates of the health status of immigrant

subpopulations are to categorizations by birthplace and time in Canada.

The data from the three CCHS cycles are consistent with the "healthy immigrant effect,"[22,23] in that they suggest that the health of immigrants who have been in Canada for a decade or more tends to be worse than that of more recent immigrants. Nevertheless, this should be interpreted cautiously, because cross-sectional data cannot be used to determine if the health of immigrants actually deteriorated with longer residence in Canada. It might simply be a cohort effect, whereby the majority of long-term immigrants may have immigrated in worse health than those who arrived more recently. It may also be that immigrants' perception of their health changes over time; that is, declines in reported health may reflect changes in perception rather than actual health status.[20] Another possibility is that with time in Canada, immigrants' use of health services increases, so the higher prevalence of chronic conditions could reflect a greater likelihood of a pre-existing condition being diagnosed.[22,24] Nonetheless, without longitudinal data to track the health status of individuals over time, it is not possible to determine if health changes are taking place.

To fill this data gap and to address other information needs, Statistics Canada is creating longitudinal databases. Specifically, the Longitudinal Health and Administrative Data Initiative (LHAD) links Statistics Canada data, such as the Census, to administrative health records of participating provinces. This makes it possible to study the health of populations, such as immigrants, who otherwise cannot be identified in administrative data. The linked data also permit analyses of subgroups that generally could not be carried out using survey data. The first LHAD linkages for Ontario and Manitoba were completed in 2011.[25]

Limitations

Although combining CCHS cycles can reduce the problem of small sample sizes, it is not completely eliminated, especially for less populous immigrant groups such as those from Sub-Saharan Africa. Also, analyses using the world-region-of-birth breakdowns could be problematic for many provinces because of the uneven geographical distribution of immigrants. And for some research questions, the six-world-region/duration-of-residence breakdown may still group individuals with different risk factors. This is especially true for geographically and ethnically diverse regions like "Asia," which includes China, India, Japan and the Philippines.[26-29] Furthermore, some immigrants lived in countries other than their country of birth before they came to Canada, thereby potentially reducing the importance of birthplace as a determinant of health.

The CCHS data are self-reported, and so may be subject to reporting error. In particular, respondents from different cultures may not interpret survey questions in the same way as people who are Canadian-born.[30] The survey instrument was tested only for the general Canadian Anglophone and Francophone populations.[30] To the extent that cultural or other differences exist in the way that some immigrant subpopulations answer questions about health indicators, the measurement of these indicators may be biased.[30] It was also not possible to examine health differences in the immigrant population by landing status—for example, those who arrived as refugees compared with those who came as family class or as economic class immigrants—because the CCHS does not collect this information.

Respondents were asked if chronic conditions had been diagnosed by a health care professional, but no independent source was available to confirm diagnoses. As well, immigrants may encounter cultural, linguistic, or other barriers that deter them from consulting health care professionals, which could lead to under-diagnosis of chronic conditions.[31]

Finally, the cross-sectional nature of the data does not allow for causal inferences.

Conclusion

A more accurate picture of how immigrants' health compares with that of the Canadian-born is important to ensure that the supply and type of health care services is appropriate. As this analysis demonstrates, general patterns in immigrant health, based on several indicators, do not apply when the immigrant population is examined by birthplace and by duration of residence in Canada. The Canadian Community Health Survey is a rich source of information about health determinants, socio-demographic characteristics and disease status not typically available elsewhere. By combining cycles of that survey, the problem of small sample sizes, which often affects studies of immigrants, can be reduced. This allows a more detailed analysis across subpopulations, which, in turn, improves understanding of immigrant health. ■

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Appendix

Table A
Countries by world region

World region	Countries
United States/Oceania/other	Australia, Fiji, Nauru, New Zealand, Papua New Guinea, St. Pierre and Miquelon, Western Samoa,United States of America
Caribbean/Central and South America	Anguilla, Antigua, Argentina, Aruba, Bahamas, Barbados, Belize, Bermuda, Bolivia, Brazil, Central America, Chile, Colombia, Costa Rica, Cuba, Dominica, Dominican Republic, Ecuador, El Salvador, French Guyana, Grenada, Guadeloupe, Guatemala, Guyana, Haiti, Honduras, Jamaica, Martinique, Mexico, Montserrat, Netherlands Antilles, Nicaragua, Panama, Paraguay, Peru, Puerto Rico, South America , St. Christopher and Nevis, St. Lucia, St. Vincent and the Grenadines, Surinam, Trinidad and Tobago, Uruguay, Venezuela, Virgin Islands (USA), West Indies
Europe	Albania, Andorra, Armenia, Austria, Azerbaijan, Belarus, Belgium, Bosnia-Herzegovina, Bulgaria, Croatia, Cyprus, Czech Republic, Czechoslovakia, Eastern Europe, Estonia, Europe, Finland, France, Georgia, Germany, Gibraltar, Greece, Hungary, Iceland, Ireland, Ireland (Republic of), Italy, Latvia, Lithuania, Luxembourg, Macedonia, Malta, Moldova, Montenegro, Netherlands, Norway, Poland, Portugal, Romania, Russia, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Ukraine, United Kingdom, USSR, Yugoslavia
Sub-Saharan Africa	Benin, Botswana, Burkina Faso, Burundi, Cameroon, Central African Republic, Chad, Comoros, Democratic Republic of Congo, Djibouti, Eastern Africa, Eritrea, Ethiopia, Gabon, Gambia, Ghana, Guinea, Ivory Coast, Kenya, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mauritius, Mozambique, Namibia, Niger, Nigeria, Reunion, Rwanda, Senegal, Seychelles, Sierra Leone, Somalia, South Africa, St. Helena and Ascension, Swaziland, Swaziland, Tanzania, Togo, Uganda, West Africa, Zambia, Zimbabwe
Asia	Bangladesh, Bhutan, Brunei, China, Hong Kong, Indian, Indonesia, Japan, Kampuchea, Korea, Laos, Macao, Malaysia, Mongolia, Myanmar, Nepal, Pakistan, Philippines, Singapore, South Asia, South Korea, Sri Lanka, Taiwan, Thailand, Vietnam
North Africa/Middle East	Afghanistan, Algeria, Angola, Bahrain, Egypt, Iran, Iraq, Israel, Jordan, Kazakhstan, Kuwait, Kyrgyzstan, Lebanon, Libya, Middle East, Morocco, Northern Africa, Oman, Palestine, Qatar, Saudi Arabia, Sudan, Syria, Tunisia, Turkey, Turkmenistan, United Arab Emirates, Uzbekistan, Yemen

Table B
Sample size, estimated number and percentage distribution of study sample, by birthplace and Canadian Community Health Survey (CCHS) cycle, household population aged 18 or older, Canada

	Total			2003 CCHS			2005 CCHS			2007/2008 CCHS		
Birthplace	Sample	Estimated number ('000)	%	Sample	Estimated number ('000)	%	Sample	Estimated number ('000)	%	Sample	Estimated number ('000)	%
Total	**350,927**	**23,649.6**	**100.0**	**117,917**	**7,739.1**	**32.7**	**114,666**	**7,625.8**	**32.2**	**118,344**	**8,284.7**	**35.0**
Canadian-born	302,698	18,575.5	78.5	101,413	6,060.7	78.3	100,886	6,200.9	81.3	100,399	6,313.9	76.2
USA/Oceania/other	3,926	269.2	1.1	1,382	95.5	1.2	1,217	83.2	1.1	1,327	90.5	1.1
Caribbean/Central and South America	4,259	602.0	2.6	1,408	200.9	2.6	1,032	137.8	1.8	1,819	263.4	3.2
Europe	25,249	2,027.3	8.6	8,980	711.7	9.2	7,466	609.8	8.0	8,803	705.8	8.5
Sub-Saharan Africa	1,477	179.4	0.8	482	58.6	0.8	302	37.2	0.5	693	83.6	1.0
Asia	11,057	1,649.7	7.0	3,474	501.7	6.5	3,259	487.4	6.4	4,324	660.6	8.0
North Africa/Middle East	2,261	346.5	1.5	778	110.0	1.4	504	69.5	0.9	979	166.9	2.0

Source: 2003, 2005 and 2007/2008 Canadian Community Health Survey

Table C
Age distribution and age-adjustment weights

Age group	Population ('000)	Adjustment weight
18 or older	25,579.6	1
18 to 39	9,797.5	0.383021
40 to 64	11,457.3	0.447906
65 or older	4,324.8	0.169073